PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Atsushi FUNABIKI , et al.

PCT Appln. No.: PCT/JP01/03223

Confirmation No.: Not Yet Assigned | Group Art Unit: Not Yet Assigned

Filed: December 14, 2001 | Examiner: Not Yet Assigned

For: POSITIVE ACTIVE MATERIAL FOR SECONDARY BATTERY, PROCESS FOR PREPARATION THEREOF AND NON-AQUEOUS ELECTROLYTE SECONDARY BATTERY COMPRISING SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 5, Please amend the First Full Paragraph as follows:

Further, since the high-crystalline β-FeOOH is a needle-like crystal having a great aspect ratio, the use of this material as an active material provides a reduced contact area between the particles. Accordingly, a large amount of an electrically-conducting agent is required to improve the electrical conductivity between the particles. As a result, the number of the active material per unit volume within an electrode is lowered, which is disadvantage.

Page 5, Please Amend the Second Full Paragraph as follows:

On the contrary, in accordance with the present invention which uses an amorphous β-FeOOH having a particle with an aspect ratio of not greater than 5, the particles can be packed densely, resulting in the improvement of the contact between the particles. Accordingly, the amount of the electrically-conducting agent to be added can be reduced, resulting in the increase in the number of the active material per unit volume within an electrode. Further, since the

contact area between the particles is large, good contact between the particles can be maintained even if the crystal lattice of the active material expands or shrinks. When the amorphous β-FeOOH having such properties is used as a positive active material for a non-aqueous electrolyte secondary battery, the cycle-life performance of the resulting electrode can be remarkably improved as compared with the conventional electrode having the high-crystalline β-FeOOH.

Page 18, Please amend the First Full Paragraph as follows:

The inductivity coupled radio frequency plasma (ICP) spectroscopy revealed that the positive active material used in the cell A1 and that used in the cell A2 of the Examples contained about 3 wt% of Ti and V, respectively. On the other hand, the positive active material used in the comparative cell B2 was found to contain about 25 wt% of V.

REMARKS

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 5, First Full Paragraph:

Further, since the high-crystalline β-FeOOH is a needle-like crystal having a great aspect ratio, the use of this material as an active material provides a reduced contact area between the particles. Accordingly, a large amount of an electrically-conducting agent is required to improve the electrical conductivity between the particles. As a result, the number~~density~~ of the active material per unit volume within an electrode is lowered, which is disadvantage.

Page 5, Second Full Paragraph

On the contrary, in accordance with the present invention which uses an amorphous β-FeOOH having a particle with an aspect ratio of not greater than 5, the particles can be packed densely, resulting in the improvement of the contact between the particles. Accordingly, the amount of the electrically-conducting agent to be added can be reduced, resulting in the increase in the ~~density~~number of the active material per unit volume within an electrode. Further, since the contact area between the particles is large, good contact between the particles can be maintained even if the crystal lattice of the active material expands or shrinks. When the amorphous β-FeOOH having such properties is used as a positive active material for a non-aqueous electrolyte secondary battery, the cycle-life performance of the resulting electrode can be remarkably improved as compared with the conventional electrode having the high-crystalline β-FeOOH.

Page 18, First Full Paragraph

The inductivity coupled radio frequency plasma (ICP)~~ICP~~ spectroscopy revealed that the positive active material used in the cell A1 and that used in the cell A2 of the Examples contained about 3 wt% of Ti and V, respectively. On the other hand, the positive active material used in the comparative cell B2 was found to contain about 25 wt% of V.